The Mining Journal

LONDON, AUGUST 29, 1958

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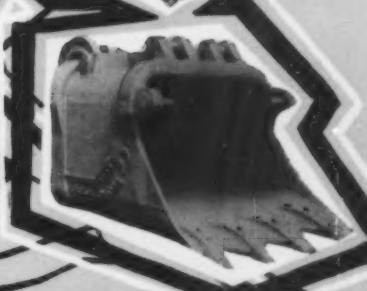

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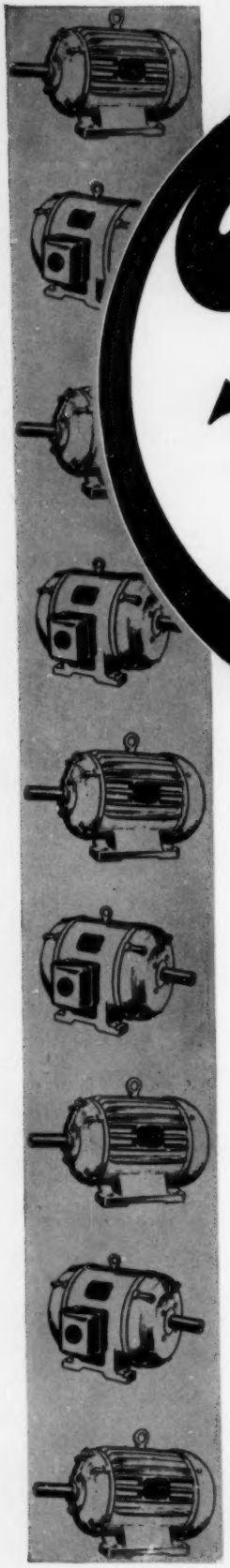

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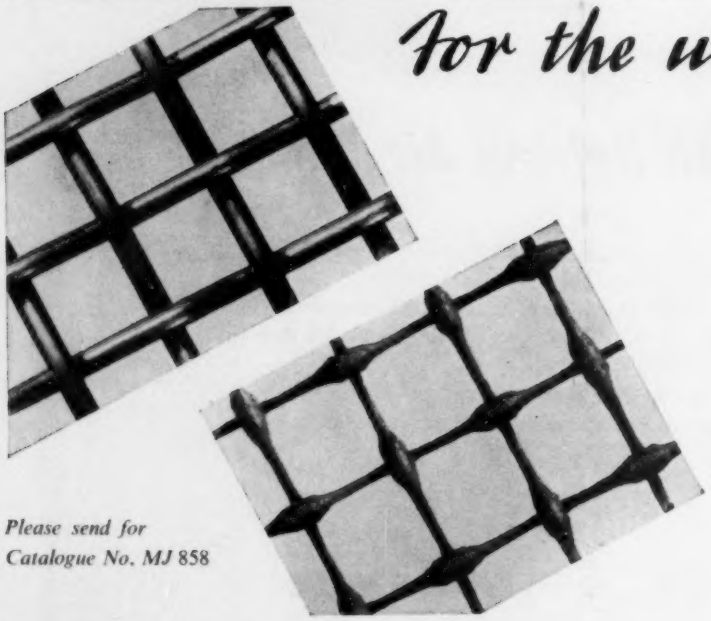

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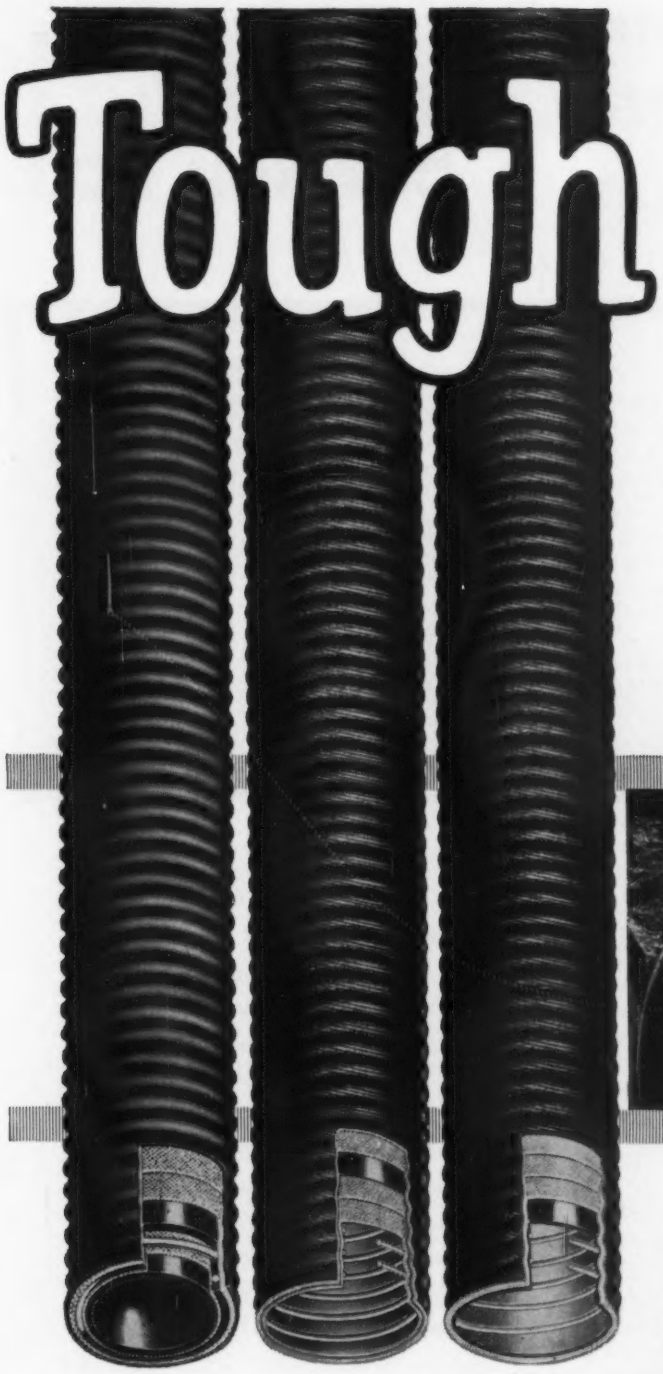

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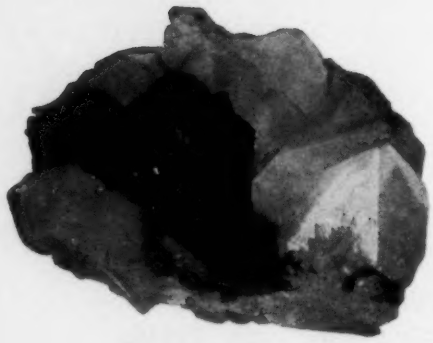

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The Mining Journal

London, August 29, 1958

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Must There be Booms and Slumps?

THE Man in the Moon, now that the Americans are trying to put sputniks in orbit around him, is doubtless following proceedings on this planet with a critical interest, not untinged with apprehension. Recent events can have done little to dispel his growing misgivings as to our sanity. More especially, he must be marvelling at our mental gymnastics over the raw materials on which our very survival depends.

Less than three years ago, Free World mineral producers were still being exhorted to expand their outputs. The U.S. Government, in particular, was accumulating scarce materials with the avidity of a squirrel hoarding nuts. In those days robbers were stripping lead from church roofs and copper was a truly golden commodity. In the merry-go-round of rising prices which revolved round the Korean War, it almost seemed at times as if supply was destined to go on chasing demand for ever, like a dog trying to catch its own tail.

Now the spree is at an end and some minerals have become so cheap that, for many producers, it is less unprofitable to leave them in the ground. A few metals, notably copper, are gradually being restored to economic health, thanks largely to drastic production cuts.

Across the Atlantic the Eisenhower Administration — like a sorcerer vainly trying to control the devils which its own spells have conjured up — has been searching rather desperately for a formula which would to some extent satisfy the clamour of the domestic mining industry for protection against lower-priced imported metal, without greatly damaging the interests of the foreign suppliers on whom Uncle Sam has been critically dependent in the past and may well be so again. Now that Congress has finally rejected the Seaton Bill, the President may no longer be able to stave off the imposition of higher tariffs, which would assuredly offend some of Uncle Sam's best customers and harm his relations with friendly powers. Meanwhile, the domestic lead and zinc industry is left in a state of uncertainty which is scarcely conducive to efficient forward planning.

To the Man in the Moon, not the least remarkable feature of the Bill that failed was that at a most critical period in its fortunes, when the House was being urged to authorize the stockpiling of 150,000 tons of copper in order to relieve the market of surplus stocks, Kennecott should have increased production at its western properties from four to five days a week and announced a further scheduled increase to a six-day week, giving as the reason the improved demand. How far this may have contributed to the defeat of the Bill is a matter for interesting speculation.

At the very time when this ill-fated Bill was pursuing its thorny path through Congress, experts of international reputation were meeting in Paris to consider the problems involved in expanding the supply of minerals to meet future world needs. In a concise and compelling statement they referred to the huge cost of finding and developing new orebodies and urged that the governments of all countries should adopt fiscal policies which would encourage investment, both national and foreign, in their mining

enterprises. It is an indisputable fact that, as the richer, shallower and more accessible deposits become exhausted, we shall have to pay higher prices to cover the rising costs of exploration and exploitation.

This was certainly very much in Mr. Seaton's mind last week, when he emphasized that to replace the capacity of the U.S. mining industry in the future would require many times the expenditure necessary to maintain it today. Indeed, while regarding government stockpiling for non-strategic purposes as at best an unsatisfactory expedient, we believe that in rejecting the proposed addition to the copper stockpile at market prices up to 27½ c. a lb., the House may well have thrown away an opportunity for an extremely profitable lock-up.

Our lunar observer may also have noted that, when the prices of raw materials are allowed to reach sub-economic levels, nobody really benefits. It so happens that a high (and rising) proportion of the Free World's mineral requirements are supplied by the non-industrial countries, which depend on raw materials for a high proportion of their export sales. If metal prices persistently remain sub-economic, the developing countries are consequently obliged to restrict importation of capital equipment and manufactured goods. Manufacturers in the industrial countries are then faced with contracting export markets and hence with the necessity for curtailing their own purchases of raw materials, however cheap. To avert the creation of a vicious circle, some form of financial assistance must accordingly be given to the developing countries to help them to buy the manufactured goods which they can no longer afford because of their reduced revenues from raw materials. This is a situation which Stephen Leacock might well have described as yet another moonbeam from the larger lunacy.

On the principle that diagnosis is the first step towards a cure, the Man in the Moon should be favourably impressed by the very important series of Conferences which are shortly taking place. In September there will be two United Nations exploratory conferences dealing respectively with the problems of copper, and of lead and zinc, and also, the Commonwealth Economic Conference in Montreal. Finally, there is the October meeting of the World Bank and the International Monetary Fund, at which President Eisenhower's proposals for increasing the resources in both these organizations will be discussed.

The difficulties of achieving commodity agreements for the three metals were discussed in our issue of July 11 pp. 37 and 38). The problems, though immense, are not necessarily insuperable, and by placing them in clearer perspective the conferences will perform a very useful task, even if no positive action results.

At Montreal it may be found that new machinery is desirable to encourage the long-term expansion of Commonwealth trade. Meanwhile, however, the changed terms of trade between manufacturing countries and primary producers should facilitate the injection of immediate stimulants in the form of extension of credit terms and inter-government loans. The U.K. and other developed countries will, of course, be closely concerned with the I.M.F. proposals for alleviating the shortage of world "liquidity", which is one of the factors restricting the level of economic activity in the World.

Despite the sharply lower metal prices and the marketing difficulties arising from the abrupt transition from scarcity to over-supply, the mining industry as a whole has shown a realistic appreciation of the long-term supply-demand picture, as is demonstrated by the extensive programmes of exploration and development currently in progress throughout the world. This outlook finds its most spectacular expression in the confidence with which INCO continues to push forward its huge Manitoba development, despite three recent output cuts.

It is high time, however, the world realized that mineral production cannot be turned on and off like a tap, and that the cows from which more milk will be demanded tomorrow should not be allowed to starve today.

ATOMIC POWER FOR MINES

The economics of nuclear power in relation to its possible introduction at Mount Isa Mines were discussed in our last week's issue (p.p. 194 and 195). It has since been announced that Mount Isa has temporarily shelved the idea of installing an atomic power plant. A report from Australia quotes Mr. G. R. Fisher, the chairman, as stating that much had still to be learned about the matter, which was out of the question for the present. A new conventional coal-fired generating plant will be ready for use at the end of next year.

This statement clearly indicates that the decision by no means represents the company's final verdict on the scope for nuclear power generation in its future programme Indeed, we may be certain that progress in the atomic field will continue to be followed with the greatest interest by Mount Isa, as well as by other mining companies which are not favourably situated geographically in regard to supplies of conventional fuels.

As a potential purchaser of atomic plant, the mining industry will have a unique opportunity for "window shopping" at the International Atomic Energy Conference and Exhibition, which takes place at Geneva from September 1-14. A preliminary note on this congress, which will be the largest technical conference ever held in the world, appears on page 228.

AN INVESTMENT IN FUTURE CITIZENS

On August 22 the Kitwe Centre and Headquarters of the Copperbelt Technical Foundation in Northern Rhodesia was officially opened by the Hon. J. M. Greenfield, Federal Minister of Education. Built at a cost of £65,000, excluding equipment, the Kitwe Centre is the fourth set of buildings to be opened since the Foundation came into active existence less than two years ago.

As Mr. Greenfield emphasized in his address, the Federation has been very fortunate in the enlightened interest taken by its mining industry in the educational problems of young and rapidly developing countries. This is exemplified in Northern Rhodesia by the establishment of the Copperbelt Technical Foundation, which was initially endowed with a gift of £100,000 from each of the major mining companies — Mufulira, Nchanga, Roan Antelope and Rhokana. In Southern Rhodesia it is exemplified by the establishment of a technical centre at the Cam and Motor Mine.

Mr. O. B. Bennett, general manager of the Rhokana Corporation and chairman of the Local Committee of the Kitwe Centre, recalls with pride that Rhokana were the original sponsors of the idea out of which the concept of the Copperbelt Technical Foundation was evolved. When examining the performances of their apprentices in their technical examinations the company was appalled at the results being obtained. On close investigation the true cause was found to be, not lack of effort on the part of the boys themselves or their instructors, but lack of the basic necessities for good teaching — adequate buildings and equipment and sufficient staff to give "live" tuition, instead of relying almost entirely on correspondence courses.

Once raised, the idea of a properly staffed and equipped training centre was enthusiastically supported by the other countries. In making their initial gifts the companies stipulated that the Foundation was not to confine itself to company employees, but was to be regarded as a gift to the youth and the communities of the Copperbelt as a whole.

The remarkable growth of the Foundation since it started operations in January, 1957, is in itself a testimony to the need which has been met. Enrolment in March, 1957, totalled 420 students, of which 327 were apprentices. Over 23 per cent of them were from outside the mining industry. At that time a further 93 adults were taking courses in eight different subjects. By March, 1958, the total enrolment was 1,023 and the range of subjects taken had increased to 26.

When it is further stated that the group certificate successes for apprentices has been raised from 10 per cent in each of the three years prior to the existence of the Foundation, to over 41 per cent last year, the accuracy of the original diagnosis becomes strikingly apparent, as well as the value of this centralized scheme both to the individual mining companies and to the Federation as a whole.

HARD TIMES FOR CEYLON GRAPHITE

Ceylon's graphite industry is having a lean time because of a gradual fall in exports, writes our correspondent in Colombo. Here are the export figures: 1956, 9,207 tons; 1957, 8,190 tons; January - April, 1958, 1,928 tons. The exports for the first quarter of this year show a decline of about 1,500 tons, compared with the exports for the corresponding period last year.

The industry is facing a crisis comparable with that of the depression days of the early 'thirties, according to the government mineralogist. Dr. L. J. D. Fernando. He states that the downward trend in the industry, which was noted in 1956, continued further in 1957 and there was a further drop of 11 per cent during the year. Moreover, producers held large stocks of graphite for which there was no market. Consequently, the smaller mines have gradually been going out of production and the number working at the end of 1957 was the lowest on record in recent years.

The wage regulations, which are more suited to mechanized mines, appear to have adversely affected the small mines which normally provide employment to a fair number of men, being worked entirely by manual labour.

The industry has only been saved by the upward movement of prices. Last year the price per ton was Rs.726. Now as much as Rs.850 has been quoted for a ton. This is said to be due to the higher grades being exported.

The decline in the trade is ascribed mainly to the fact that stockpiles of the period immediately after the war are now being released and to the general depression experienced by the countries supporting graphite, notably the United States of America.

Last year, for the first time, an export duty of Rs.50 per ton was imposed on graphite exports. This year the import of processed graphite has been allowed at a general duty of 2½ per cent, the object of this importation being to permit the manufacture of dry-cell batteries, which has been undertaken by a firm in Ceylon.

PIPELINE TRANSPORTATION

The 108-mile coal pipeline linking Georgetown and Eastlake, Ohio (*vide The Mining Journal*, May 30, p. 636), is now reported to be in full operation. Constructed after many years of planning as a joint undertaking by the Consolidation Coal Co. and the Cleveland Electric Illuminating Co., it is by far the longest solids-transporting pipeline in the world. The electricity supply company has contracted to purchase 18,000,000 tons over 15 years.

The pipeline and associated equipment cost approximately $13,500,000 to build. The line is of 10¾ in. dia. and is buried beneath the frostline. The coal is prepared at Georgetown, where it is cleaned and crushed to a specified size, after which it is mixed with an equal proportion of water. The slurry is sent through the line by three pumping stations, one at the initial stage of preparation and the other two at appropriate intervals. On arrival at Eastlake, the water and coal are separated and the coal dried for use in the power station. The separated clear water is discharged into Lake Erie and, because of filtration and clarifying, is purer than the lake water.

While the success of this ambitious undertaking augurs well for the future of hydraulic transportation, it is noteworthy that the Bureau of Mines, U.S. Department of the Interior, has reported unfavourably on pipeline transportation of Texas lignite. The Bureau's findings result from a study conducted co-operatively with the Texas Power and Light Co. to determine the feasibility of pumping small sizes of lignite suspended in water for 20 to 100 miles—i.e., from the company's mines to its generating plants — and then thoroughly drying it for use as fuel. It was concluded that hydraulic transportation for distances less than 100 miles would cost more than moving the lignite by truck or rail, because of degradation of lignite in the line and the high cost of de-watering it for use. When compared with the costs of current competitive transportation, those of hydraulically transporting and drying lignite were considered too high to justify further investigation.

The Bureau adds that conclusions reached regarding lignite "do not necessarily apply to the hydraulic transport of bituminous and higher rank coal".

The potentialities of pipelines for the economic transportation of solids have, of course, been demonstrated by commercial operation in countries other than the United States, though on a less spectacular scale than the 108-mile pipeline in Ohio, which by virtue of its magnitude can justly be regarded as a pioneer undertaking.

EXCESSIVE STOCKS OF COAL

According to the President of the West German Miners' Union a desperate situation has developed in the Ruhr due to excessive stockpiling of coal. There are no less than 10,000,000 tons at the pitheads and a further 11,000,000 tons are held by distributors. Together with a further 1,000,000 tons in the Saar these coal stocks are worth nearly £55,000,000.

The miners' leader blames the current situation on long-term government contracts to buy U.S. coal and has made the point that the Federal Republic is not obliged to sustain American economy by the continued import of unwanted fuel, both coal and oil.

A possible way out of this rather difficult situation may be in allowing Western Germany to re-export U.S. coal to countries outside the European Coal and Steel Community. In an endeavour to mitigate the coal crisis the Federal Ministry of Economics has shortened the long-term contract period from three years to 18 months.

Despite an appreciable fall in production, Britain is also finding difficulty in disposing of coal output and it is estimated that unsold small coal is accumulating at the rate of 5-6,000,000 tons a year. This represents a lot of capital tied up, quite apart from the appreciable expense incurred in dumping and subsequent removal of tonnages of coal of this magnitude.

Current Aspects of Australian Coal Mining

AUSTRALIA'S important coal mining industry is showing a definite advance, despite the heavy competition by oil and the loss of black coal markets in New South Wales to oil and Victorian brown coal.

Actually, in the increasing demand for power in this country, coal is slipping back in comparison to oil, the proportion of coal in fuel consumption in 1956-57 being 45.6 per cent compared with 50.1 per cent in 1950-51. However, because of rising demand for power, the output of coal is rising and will continue to do so.

The Rise in Status

In the great rise in the status of the industry, the credit is shared by the Joint Coal Board and the colliery proprietors, for steady and continuous effort. In ten years a high level of mechanized production has been reached, with record outputs. The sum of £A24,000,000 has been spent in modernization in the past ten years, of which £A6,700,000 was spent in 1956-57. Coal preparation has now been applied to 30 per cent of the output.

In 1956-57 New South Wales produced 15,230,000 tons of black coal, and Queensland 2,749,000 tons, making with Western Australia, a total production of 19,744,000 tons, the Australia-wide consumption being a record at 18,648,000 tons. As a result of mechanization cost of coal has been reduced 10 per cent in five years; at June, 1957, the price was 57s. 11d. per ton, and it is thought that a further fall in price will be recorded in the current year. The success achieved has been brought about by mechanization and forceful marketing. Nearly all New South Wales mines are now mechanized, and in mechanization, the continuous miner is a very important factor. It must be noted that the fall in price for coal has been achieved in the face of rising costs for wages, materials and power.

In marketing, the trend is towards the development of special purpose mines, producing for steel works, power stations, gas and industrial users, metallurgical coke being the objective of the large group of collieries owned by the Broken Hill Proprietary Co., and its subsidiary, Australian Iron and Steel. The industry now supplies graded coal to customers' specifications as to size and type; two collieries are each producing seven gradings of washed coal. Nineteen mines are now producing washed coal and six more plants are under construction, while nine other companies are preparing plans. A satisfactory feature is the rise in overseas shipments of coal, from an almost defunct position to 204,000 tons in 1955-56, 550,000 tons in 1956-57, and a stated tonnage of 750,000 in the year 1957. There has been a substantial decrease in the number of men employed, accompanied by a substantial increase in tons of production.

The future of black coal in the State of New South Wales will be greatly helped by the construction of two large thermal power stations at an estimated cost of £A120,000,000, one of which will consume 3,000,000 tons of coal per year. It is expected that by 1975, 40 per cent of Australia's energy will be supplied by black coal, and in the immediate future, substantial increase in export overseas of coal may be established. The colliery proprietors have established, in association with the Commonwealth Organization for Scientific and Industrial Research, a research organization which is spending £A100,000 per year in investigations into the utilization of coal, in three separate research establishments and on the collieries themselves.

Coal-Fuelled Gas Turbine Research

A completely new field for using coal is possible as a result of the work of a small group of engineers at the Commonwealth Government's Aeronautical Research Laboratories in Melbourne. This group, which has been working for some years on the problem of applying indigenous fuels to a new type of industrial, the gas turbine, now believes that a successful method has been found of utilizing Victorian brown coal as a turbine fuel. Because of its responsibilities in the fuel field, the Department of National Development assumed financial responsibility for this research as from July 1, 1957.

Until now the critical problem associated with the use of coal as a turbine fuel has been the damaging effects on the turbine blades of erosion, corrosion and deposition arising from impurities in the coal—a problem which either does not arise or is negligible when petroleum distillate fuels are used to fire the gas turbine.

The A.R.L. research group has developed a prototype combustion chamber which permits the efficient combustion of pulverized coal at rates about one hundred times greater than that in steam boiler practice. It has proved so successful that it is now possible to advance experiments from laboratory and bench scale to the stage involving the experimental operation of an engine on a commercial scale.

For this purpose, a 1,200 h.p. gas turbine engine is at present being installed at the laboratories. After calibration on distillate fuel, the engine will be subjected to tests with the newly-designed combustor using Victorian brown coal. These tests should commence towards the end of this year.

Experiments are also being made in the use of various types of black coals as fuels for gas turbines. It is likely that the same type of combustor as used in brown coal work will form the basis of the furnace for an air heater which may enable black coal to be used also in the operation of a gas turbine.

The open cycle gas turbine engine possesses many decided advantages over the diesel engine and the steam turbine. It requires less maintenance and less lubrication than the diesel and less space than either the diesel or the steam turbine. It has the added attraction of operating independently of water supply. Gas turbines, whether operating on fuels or waste heat, are suitable for meeting a wide variety of requirements. If they can be developed to operate efficiently on coal the benefit from the national point of view can hardly be over-estimated.

The Sulphur Industry Looks Ahead

Once more the sulphur industry and its problems are in the news, this time because of so-called oversupply rather than shortage. In a recent speech (here summarized) before the New York Society of Security Analysts, Mr. Langbourne M. Williams, president of the Freeport Sulphur Co., advocated an increase in sulphur productive capacity and higher sulphur prices as being in the best interest of producers and consumers alike.

SIX years ago sulphur was in short supply. There were some gloomy predictions at that time about the future of the sulphur industry, particularly about the Frasch process in the U.S. The Frasch process, which accounts for by far the largest part of U.S. domestic production, is the hot-water process by which molten sulphur is brought up from salt dome deposits along the Gulf Coast. Some people seemed to think that the Frasch industry was running out of reserves and that it never would catch up again with the demand.

Freeport did not encourage the view that sulphur would remain in short supply, but emphasized that the chief cure for the situation—when national needs or policy should permit—was the free working of the law of demand and supply. And this, of course, is what solved the problem. When price controls were removed after the Korean War, the price of sulphur went up and supply increased.

Effect of Price on Supply

Today sulphur is widely discussed as being in oversupply. Again Freeport does not take the extreme view. If present trends continue, the oversupply will disappear. The reason for this is the effect of price on supply. Sulphur is being sold by some producers—notably the Mexicans—at prices which are back where they were when the shortage occurred during the period of price controls at the time of the Korean War. If this continues, some mines will cease to produce. Furthermore, some new projects now under consideration will not go forward. Eventually, sulphur will be in short supply again.

But before the shortage is again corrected by the working of the law of supply and demand, some unfortunate things will happen. Mines once closed down—particularly Frasch process mines—rarely resume production. Consequently, the sulphur left in the ground at the mines which shut down will be lost for ever. There will also be much suffering on the part of people put out of work. Since it takes a long time to find and develop new sources of supply, sulphur-consuming industries will find themselves short of an essential raw material for an extended period. This need not happen.

When the price of sulphur went up, quite a number of new sources of supply entered the market. It is only natural that when a number of new producers enter a market at the same time, their efforts to obtain customers will result in a certain degree of turbulence. To be more specific, it would not be natural for an American consumer who has had established relations with the big American sulphur producers over 20, 30 and sometimes 40 years, to leave those sources of supply and buy his sulphur at an equal price from Mexico. Hence, Mexican sulphur had to be introduced into the market at a reduced price. However, there cannot continue to exist a differential between the price at which an American producer sells a raw material like sulphur and the price at which another producer sells the same raw material according to the same specifications. Once it has been established that the new product is satisfactory and the new producers have found their places in the market, the customers will not permit the differential to exist.

The time has come, declared Mr. Williams, to recognize that it is not in the best interest of the country, the consumers and the producers that this differential be allowed to continue, thus forcing the price of sulphur to go on drifting down. The Mexican producers have sound, experienced, successful people backing them. Their production is well established and they have secured a recognized place in the market of the world.

Mr. Williams considers that the price of sulphur is at present too low. In the 25 years since he became president of the company, the price of Freeport's sulphur has risen only 30 per cent. On the other hand, tin has increased in price 140 per cent, zinc almost 150 per cent, petroleum more than 200 per cent, lead about 235 per cent, and copper almost 250 per cent.

In the fundamental raw materials there can never be a perfect balance between supply and demand. There will always be either some excess capacity or some deficiency. If we wait until there is an actual shortage and then get started on a new mine, we may not cure the situation for four or five years. The obvious answer is to be looking ahead and taking steps to see that there is always excess capacity.

Except for a short period at the time of the Korean War, the sulphur industry has always had excess productive capacity, and this is the condition in which it has wanted to be. It has had an unusual growth in the use of its product, largely because consumers could be sure of their supplies. This assurance has been an important reason why *per capita* consumption in the U.S. has increased from 25 lb. a quarter of a century ago to 75 lb. today.

Vast Potential Markets

The president of Freeport is convinced of the necessity for increased supplies and excess capacity for sulphur because he foresees very substantial increases in the demand. Sulphur is used in everything we eat, wear and use.

An example of the myriad industries which use sulphur is atomic energy. It is estimated that this year the world will use 500,000 tons of sulphur in the production of uranium oxide; some authorities have predicted that by 1970-75 the amount of uranium oxide needed for power requirements alone may be double to triple the present production.

The large nickel-cobalt concentrating plant which Freeport is building in Cuba will use sulphuric acid to leach lateritic ores by means of a new process developed by the company. For this one operation alone 160,000 tons of sulphur a year will be needed. Five of the 14 Frasch mines in the U.S. and Mexico produced less than 160,000 tons last year. The major nickel reserves of the world are in lateritic ore, and in time the use of sulphur to treat such ores could increase very substantially.

The possibilities for the increased use of sulphur in fertilizers are even more startling. More than one-third of all the sulphur used in the world is consumed in the production of fertilizer—primarily the basic materials, ammonium sulphate and superphosphate. On a world basis ammonium sulphate supplies approximately one-third of the world's

fertilizer nitrogen requirements, while superphosphate supplies about three-fourths of the fertilizer phosphorus requirements. In the manufacture of ammonium sulphate, 500 lb. of sulphur are used per ton of product; in normal superphosphate 250 lb. of sulphur are required per ton of product.

Experts believe that by 1965 we shall have to find food for at least 450,000,000 additional people, and that is more than the present combined populations of North, Central and South America.

A rough measure of the potential for fertilizer in the Far East may be gained by using South Korea as a yardstick. While South Korea uses only about half the fertilizer which agronomists consider necessary for her soil, she is relatively wise in the ways of soil nutrition compared to other Far Eastern nations.

Let us suppose that India, China and other Far Eastern countries were brought up to the fertilizer standards of South Korea, where in a recent year an average of some 70 lb. of nitrogen, phosphates and potash was applied to each cultivated acre. On this basis, the Far East would consume some 25,000,000 tons of plant nutrients per year over her 800,000,000 acres of cultivated land. According to a conservative calculation of the sulphur involved in the nitrogen and phosphate materials making up the bulk of this vast potential fertilizer tonnage, 12,000,000 more tons of sulphur would be needed each year.

The use of such figures may seem fanciful, but 25 years ago it would have seemed even more fanciful to predict that within a quarter of a century Freeport's sulphur output would have increased five times. It seems sensible to expect a greater growth in the next 25 years, taking into account all the cumulative factors throughout the world such as rapid communications, which are causing such an insistent demand for increased standards of living. However, at the same rate of growth as in the past 25 years, the world will be using 50,000,000 tons of sulphur in 1983 as compared with about 16,000,000 tons this year.

Consider what this means in terms of mines. Freeport was organized in 1912 to develop Bryanmound in Texas. Bryanmound did not become exhausted until 1935. During that period it produced 5,000,000 tons. Today, the U.S. alone is using up more than one Bryanmound every year; if we have the same growth in the next 25 years as in the past 25 years, the U.S. will be using in 1983 one Bryanmound every three months. There are quite a few good mines throughout the world that will not be producing sulphur in 1983.

In view of the potential demand for sulphur that can be envisaged, it is fortunate that, in addition to the new Frasch mines now under development, other increases in supplies can be foreseen from sour natural gas in Canada and France.

SULPHURIC ACID IN SOUTH AFRICA

South Africa has become a major world producer of sulphuric acid. African Explosives and Chemical Industries, the leading commercial manufacturer, has a daily output capacity of 900 tons, and the gold industry can supply an additional 1,550 tons a day. Six years ago the daily output was less than 30 tons.

Until recently, African Explosives' annual sales averaged some 8,000 tons. In 1958 two large customers alone are expected to buy 55,500 tons between them. These are SASOL, which uses the acid to scrub the ammonia yielded in the oil-producing process, and the South African Iron and Steel Corporation. SASOL is expected to buy over 33,000 tons of acid during 1958 and Iscor 22,000 tons.

FROTH FLOTATION—II

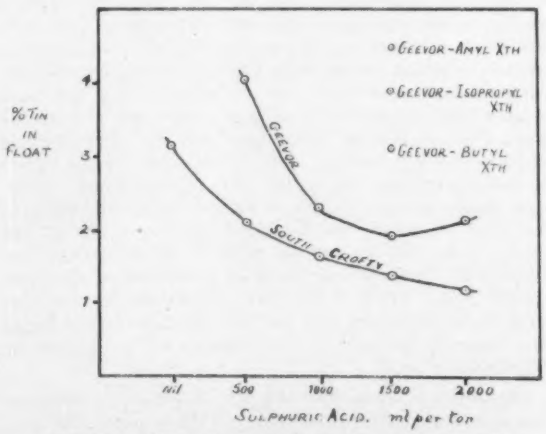
Factors Influencing Flotation in Tin Ore Dressing

By F. B. MICHELL

It has been shown previously by the author that tin loss is related to pulp acidity. That is to say, decrease in pH or increased acidity reduces the tin loss. It has also been shown by Mitrofanov and Kusnikova (paper I.M.D.C. Stockholm, 1957) that the maximum sorbtion of butyl xanthate occurs around pH 4.5 to 5.0—in other words, both from the point of view of tin loss and most complete flotation we are likely to get the best results at a low pH. The effect of varying acidity has been determined for concentrates derived from Geevor and South Crofty.

These indicate that the reduction of the tin loss follows the addition of acid but that the effect gets less pronounced as the acidity increases. One must remember that the pH, however, is a power function of the acid strength so that in terms of pH the picture is different. With the South Crofty material there is a gradual reduction in the tin loss whilst in the case of Geevor ore, the effect of increased acidity is to reduce the loss to some 1,000 ccs. per ton (or 0.5 ml. per litre in terms of concentration) but after 1,500 ccs. per ton the tin loss rises. The rapid decrease in tin loss may be due, therefore, to the partial suppression of ionization at the lower pH due to the hydrogen ion.

On the other hand, in the presence of copper minerals, an equilibrium may be obtained, more copper being dissolved by the acid and thereby affecting the tin floatability. It must also be remembered that another effect of the presence of acid is to clean oxide crust on the sulphides, promoting more rapid flotation.

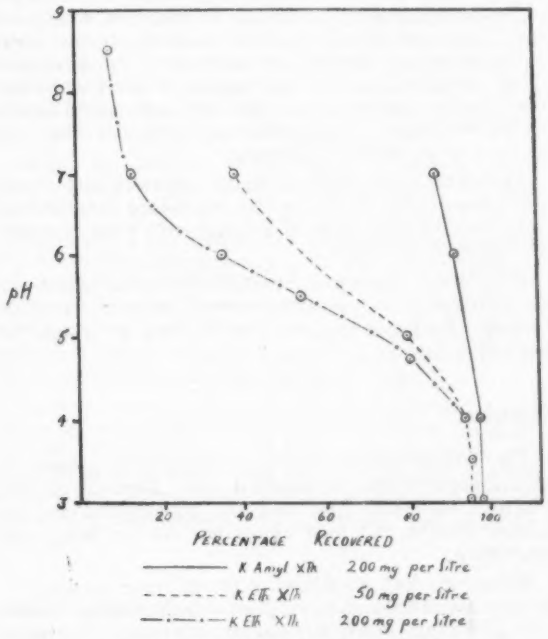


Varying acidity of concentrates from Geevor and South Crofty

This article is the second instalment of a paper recently presented to the Cornish Institute of Engineers. It is now about 30 years since flotation was introduced as part of tin dressing operations and a great many advances have taken place, although there is still much to be learned about the physical chemistry of surface interactions and the mechanism of such aspects as slime coating. This concluding instalment discusses the effects of pulp acidity and of pH on arsenopyrite flotation.

This has been examined using pure arsenopyrite from South Crofty and a laboratory technique employing skin flotation.

For this purpose a sample was prepared by dry crushing to 8 mesh, removing all −72 mesh, the oversize was wet ground to pass 30 mesh and the −72 mesh again removed whilst the oversize was washed to remove any silica. A



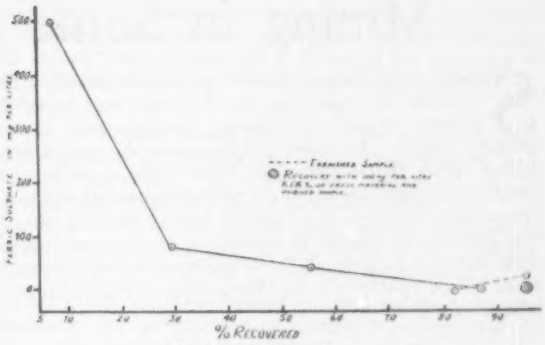
Arsenopyrite flotation at South Crofty

measured quantity was then shaken with either sodium carbonate or dilute sulphuric acid for the required pH regulation, ethyl xanthate added amounting to 200 mg. per litre and agitated for five minutes. The sample was next transferred to the dish and treated with five washings, determining the amount floated.

Similar results were obtained with 50 mg. per litre ethyl xanthate and as would be expected the effect of pH is less pronounced with amyl xanthate.

It is clear from these results, however, that a low pH is desirable, particularly for ethyl xanthate. Thus, if we use a lower xanthate to prevent excessive tin loss, we must use a low pH.

The effect of addition of ferric sulphate was also investigated as flotation is considered better, particularly when the surface is partly oxidized in the presence of a small addition which is said to be due to common ion activation. With a fresh sample, however, the addition is detrimental until a very low concentration is reached. This is in keeping with the theoretical as there would be no need to metal-



Ethyl xanthate recovery

lize the surface of fresh mineral. Investigation of arsenopyrite which had been allowed to stand for four weeks in a damp state gave similar results using 20 mg. and 50 mg. ferric sulphate per litre but some slight improvement was noticed at 20 mg. per litre.

Unfortunately, in most samples, some surfaces may be affected more than others, so that even if the addition were beneficial in one case, it would be detrimental in the other.

On badly oxidized samples, however, which had been allowed to become heavily altered, in one instance the author found the addition of ferric sulphate to be beneficial when one presumes it tends to be sorbed at the surface at points where iron has been leached out.

Unless this is the case, there is no reason to use this reagent and, furthermore, its presence in the mine water is likely to interfere with flotation. The effect of salts such as copper sulphate, ferrous and ferric sulphate has also been investigated by Mitrofanov who shows that they reduce the sorption of xanthate on certain sulphide surfaces. He has also shown that copper sulphate lowers the sorption on chalcopyrite very appreciably.

From the foregoing it will be clear that a very great number of factors influence flotation, and to get optimum recovery one must have a considerable knowledge of the minerals to be eliminated in the bulk flotation of sulphides in tin ore concentrate.

There are a few salient points, however:

(a) The selection of a frothing agent or frother mixture is important.

(b) The use of higher xanthates must be approached with caution, as they tend to increase tin loss and do not always improve the recovery of the sulphides.

(c) The pulp should be acid but the loss of tin does not necessarily follow the increase in acidity—possibly due to the presence of metal ions.

(d) An activator such as copper sulphate may have harmful effects both on tin loss and actual flotation of one mineral whilst activating another.

(e) The presence of other metal ions may have a detrimental effect on flotation of some sulphides and, unfortunately, these are almost always present in an acid pulp.

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Mining in Some Far-Eastern Countries

SINCE 1951 the secretariat of the Economic Commission for Asia and the Far East has issued an annual review of mining developments in the ECAFE region. Its latest report covers the period from July 1, 1955, to December 30, 1956. The main developments during that period in the principal mineral and metal producing countries—e.g., India, Japan, Malaya and the Philippines—are known to readers of *The Mining Journal*. This review is accordingly being confined to those countries from which relatively little information is normally available from other sources.

The countries here surveyed are Afghanistan, British Borneo, Cambodia, China (Taiwan), Hong Kong, Laos, Nepal and Southern Viet-Nam.

Afghanistan

Considerable progress has been made in Afghanistan, both in geological surveying and in the development of mineral resources. Work was begun on the compilation of the first geological map of the country on a scale of one to 1,000,000. A geological reconnaissance survey was made across the country, from south-east to north-west. This was accompanied by a survey of possible radioactive mineral-bearing areas.

The mineral output in 1956 was as follows (in tonnes unless otherwise specified): Salt (four mines) 23,750, coal (two mines) 23,040, lapiz lazuli (kgm.) 1,100, beryl 45, slate (sq. m.) 8,074, and sulphur 15.

Modernization of the coal mines has been making progress. A survey was made for the purpose of improving the transportation system of the Darra-i-suif coalfield, the most promising in the country.

A preliminary survey of some of the sulphur deposits indicated 200,000 tonnes of proved reserves with a sulphur content averaging 44 per cent, but no systematic mining of sulphur was carried out during the period under review. Beryl was mined in the eastern part of the country for export. Owing to lack of demand, a chromite deposit with a known reserve of 200,000 tons (chromic oxide content 48-56 per cent) was not mined.

British Territories in Borneo

Mineral products obtained in the British territories in Borneo during the period under review included crude oil and petroleum, natural gas, gold, phosphates, limestone and stone for road building. Oil was of outstanding importance; Brunei production continued to be the second highest in the Commonwealth. The output of other minerals was small.

Last year, exports of mineral products from British Borneo reached the record value of Malayan $376,900,000, according to the annual report of the Borneo Geological Survey.

Known mineral resources not worked include, coal, diamonds, garnets, gypsum, pyrites, talc, kaolin, zircon, ilmenite, monazite, and the ores of aluminium, antimony, arsenic, chromium, copper, iron, lead, manganese, mercury, silver and zinc. Of these, coal and bauxite occur in west Sarawak in sufficient quantity to be worth mining, and the mercury and antimony ores may repay operations on a small scale. Of the other minerals, only small or inaccessible deposits have so far been recorded.

Geological mapping by the Governmental Geological Survey Department progressed rapidly and resulted in a number of discoveries of new mineral resources and an increase in the use of local resources.

Although the occurrence of gold is reportedly widespread in British Borneo, during 1955 and 1956 mining was confined to the Bau field in west Sarawak. There was a new discovery of lode and alluvial occurrences in the isolated Rajang headwaters in Sarawak, but it is doubtful if gold exists there in commercial quantities. The total gold output of Sarawak from 1864 to 1955 inclusive was recorded as 37,769 kgm. Since the Second World War the largest annual output was 47.37 kgm. produced in 1949.

The accessible Bau goldfield was formerly the source of practically all the gold produced. Whether it can regain its former importance is doubtful. At Bau, most mineralization is restricted to small pockets and veins, which in many places have been enriched by weathering. No large low-grade orebodies have yet been found. Thus, it seems that the future of gold mining in this area will depend largely on the possibility of discovering more very rich veins, such as those at the Rumoh gold mine.

Phosphate in the form of guano occurs in many limestone caves in British Borneo but is obtained commercially only from the Niah caves in Sarawak, which are estimated to contain 29,000 tonnes.

Bauxite was discovered during 1949 in west Sarawak by the Geological Survey Department. A local company, Sematan Bauxite Ltd., will shortly start exporting this mineral to Japan.

Cambodia

The development of mineral resources in Cambodia is handicapped by lack of technical staff. Deposits of coal and iron, phosphate, gold, lead and molybdenum ores are known to exist, but their extent has not yet been fully established.

Bokeo, 160 km. north-east of Stung Treng, is the production centre for zircon, sapphire and corundum. About 100 kg. of rough stones are handled each month. The pagodite, found at Tasey, is worked at Pursat by specialized craftsmen.

China (Taiwan)

Geological surveying and mineral exploration were carried out by the Geological Survey of Taiwan, Coal Explorations Ltd., the Petroleum Exploration Bureau of the Chinese Petroleum Corporation, and the mineral survey team of the Ministry of Economic Affairs.

Mineral products include coal, sulphur, pyrites, gold, silver, copper, aluminium ingot, limonite, dolomite, marble, talc, graphite, serpentine, asbestos, kaolin, mica, salt, gypsum, petroleum and natural gas.

Coal output has gained steadily since the end of the Second World War in order to meet the growth in demand arising from the expansion in manufacturing industries and thermal power stations, as well as from the increase in railway traffic. According to the second four-year plan (1957-1960), the demand for coal is expected to increase from 3,100,000 tonnes in 1957 to 4,350,000 tonnes in 1960 and

the government has, therefore, taken measures to step up production.

During 1956 the Chinese Coal Mine Development Corporation was set up, the principal shareholders being the government-controlled Taiwan Power Corporation and Taiwan Sugar Corporation, two of the largest coal consumers in Taiwan. The corporation is to develop coal mines, produce coke, explore new coal fields, render technical and financial assistance to privately-owned coal mines, and handle coal exports.

Of approximately 250 coal mines operating in Taiwan, only a few produce more than 5,000 tons a month and only two over 10,000 tons. Production is at present confined to the northern part of the island, but it is planned gradually to develop more mines in the central part. The coking coal field at Nanchuang was developed during 1956 and coal mining under the sea was planned at the Moshan and Chien Kee mines. Two experimental mines, using modern machines and re-treating methods, commenced operation.

Sulphur has become an important mineral resource, with a record production of 8,400 tonnes in 1956. A detailed study was made of the sulphur deposits in Szehuantzeping, where the main ores are pyrites, marcasite and native sulphur. Exploration has also been undertaken in the Chinkuashih, Kingshan and Chihsinshan areas. It is estimated that the extractable reserves in the Chinkuashih area alone amount to 910,000 tonnes.

Among the countries of the region, Taiwan is second only to Japan in aluminium output; production of ingots reached 8,759 tonnes in 1956.

Preliminary investigation has revealed the occurrence of uranium-bearing minerals (both primary and secondary) in the pegmatite veins in the north-eastern part of the island, but in some deposits the average uranium content appeared to be too low for economic extraction. Heavy sands, both beach and placer, have also been investigated; they were found to consist mainly of magnetite.

A general survey of gold deposits in the central mountain range and along the east coastal range was continued in 1956. It was found that there were workable gold placer deposits in areas along the Takiri stream and that gold-bearing quartz veins were well developed on the east side of Choshetashan and on the west side of Siukuluanshan.

Hong Kong and Laos

During 1956, the output of the magnetite deposit at Ma On Shan continued to head Hong Kong's mineral production. There was also underground mining for lead, wolfram and graphite, while kaolin, quartz and feldspar were worked by opencast methods.

Underground development at the Ma On Shan mine has been proceeding rapidly. By the end of 1956 the transition from opencast to underground operation had almost been completed. Exports comprise both lump ore, with an average iron content of 46.28 per cent, and concentrates averaging 56.16 per cent.

Mining of a seam of graphite in the sedimentaries on West Brother Island continued, with increased production towards the end of 1956. Prospecting for further graphite deposits took place. Owing to continued low market prices and the unfavourable nature of the deposits, output of wolfram remained low, production being only from two mines. Experimentation in the U.S. with a 1-ton shipment of beryl indicated that production would not be economic in present conditions.

Apart from tin, there is at present no mineral production of any importance in Laos. During 1956 mine output of tin was 826 tonnes, all from Phontiou in the vicinity of Thakhek. The mineral-bearing area seems to be large and survey work, particularly if aimed at the discovery of original lodes, would probably lead to a substantial increase in production.

Mineral deposits known to occur in the country include lignites, anthracites, pyrites, and ores of iron, copper, lead, zinc and antimony. In upper Laos, the valley of the Mekong and many of the tributaries contain gold. At Ban Don Men, south of Pak Lay, important lodes of quartz outcrop in the bed; on the banks of the Mekong, gold-bearing alluvium and gravel have been found.

To further the development of the country's mineral resources, the government has under consideration an aerial survey by Canadian experts under the Colombo Plan. It is also contemplating an invitation to a team of Japanese experts to explore the mineral potential of Laos.

Nepal

Geological surveying and mineral exploration in Nepal have been carried out under the direction of the Bureau of Mines of Nepal with assistance provided by the United Nations Technical Assistance Administration, the Geological Survey of India, and the United States Operations Mission.

A general geological reconnaissance survey by a United Nations expert was scheduled for completion in 1957 and an economic survey of mineral deposits was also under way. Examination of the Bhainse limestone series indicated its suitability for cement manufacture. A preliminary survey of iron deposits in Godavari Phulchowkidanda gave an estimate of 1,000,000 tonnes of ore reserves; a more precise assessment is being obtained. Mining was started by the Nepal Mica Co. on mica deposits located north of Kathmandu valley. Prospecting for coal and the investigation of a copper deposit in Nangre and a nickel deposit in Bhorle were expected to be carried out in 1957.

A draft five-year plan, published by the government in September, 1956, recommended a general study of the geology of the country and specific studies to determine the mineralized zones; the selection and appointment of qualified technicians for training abroad; and the formulation of a continuing programme for the exploration and development of mineral resources. It was considered that the following industries might be started during the five-year period : a mica plant, a cement factory using local coal, and small-scale production of copper, nickel, cobalt, lead and zinc ores.

Southern Viet-Nam

Considerable attention has been paid to the development of the Nong-Son coalfield, the only one of importance in southern Viet-Nam. It covers an area of 3,000 hectares and is located about 100 km. south-west of Faifoo. The field was first developed in 1881; it was mined from then until 1922 and again from 1943 to 1945. In September, 1956, a contract was granted by the government to a Japanese firm to core-drill 27 holes from 5 to 100 m. deep. It is hoped to obtain 150,000 tonnes of coal annually.

A copper deposit at Buc-Bo was surveyed and was considered promising. A complete exploration programme has been drawn up for implementation when local conditions permit. Some exploratory work has been undertaken on ilmenite sands along the coast of central Viet-Nam. Prospecting for molybenite deposits in the region of Khrong-Pha was expected to begin.

Machinery and Equipment

Aspects of Concreting in Shaft Sinking

An article published in *Journal of the South African Institute of Mining and Metallurgy, Vol.* 58, *No.* 11, by G. A. Merricks and M. H. Thompson, respectively manager of F. S. Saaiplaas G.M. Co. Ltd., and assistant consulting mechanical engineer, New Consolidated Gold Fields Ltd., described shaft sinking operations at Free State Saaiplaas, and in one portion of the article made interesting mention of the concreting pipes and feed boxes employed during these operations.

With the speed of sinking envisaged, some thought was devoted to the piping and concrete feed box with the view of obtaining longer life, freedom from choking, and greater safety. It is well known that the prime causes of breakdown of concreting pipes is incorrect matching of the barrels at the joint, malalignment, and indentations made during handling and transport. With these considerations in mind, pipe joints and brackets have been designed to counter the traditional deficiencies.

Pipe flanges are placed 1 in. back from the ends, which are machined to give a metal-to-metal joint, no gaskets being used. A special flexible locating band is provided, its purpose being to match up the two spigots before the joint is pulled up tight, thus insuring matching of the barrels irrespective of the flanges. Two extra holes are provided in the bottom end flange of each pipe, so that by means of two bolts and nuts the pipes can be jacked apart for replacement. The pipes are solid drawn, ½ in. wall thickness.

The pipe clamps are provided with adjusting screws by means of which errors in the setting of the brackets can be compensated for when plumbing the pipes.

The concrete feed box designed to replace the conventional kettle is split vertically and has two compartments connected by an 18 in. by 12 in. opening in the ½ in. thick partition plate. The compartment directly connected to the pipe has a ¼ in. vertical side liner, and a portion of a discarded mill liner is used on the bottom. When in use, the feed boxes are slung on steel straps from nut boxes cast into the shaft lining.

NEW RANGE OF MINING TRANSFORMERS

Metropolitan-Vickers Electrical Co. Ltd. has introduced a range of nitrogen-filled sealed pattern mining transformers with Class H insulation, for use underground in coal mines.

The units are specially designed, both in shape and size, for convenience of installation underground, and are lighter than conventional oil-filled transformers. They are contained in robust weld-sealed tanks, which are easily cleaned, and are fitted with special metal-seal bushings.

The maximum case temperature is no higher than that of conventional oil-filled units. The nitrogen is under pressure and a special switch is fitted for leak detection and warning.

A further special feature embodied is the flameproof pattern neutral link and fuse chamber, which permits either single fusing as N.C.B. Specifications P.108 and P.109, or double fusing and phase-to-phase excitation of the injection coil.

The transformers are three phase and have a standard voltage ratio of 3,300/565 volts at no load, with H.V. tappings for minus 5 per cent and minus 10 per cent brought to links in a flameproof pattern oil-filled chamber on the tank end. They are suitable for the reception of standard cable terminations, such as multi-directional cable boxes and plugs and adaptors.

LAMP ROOM GOES UNDERGROUND

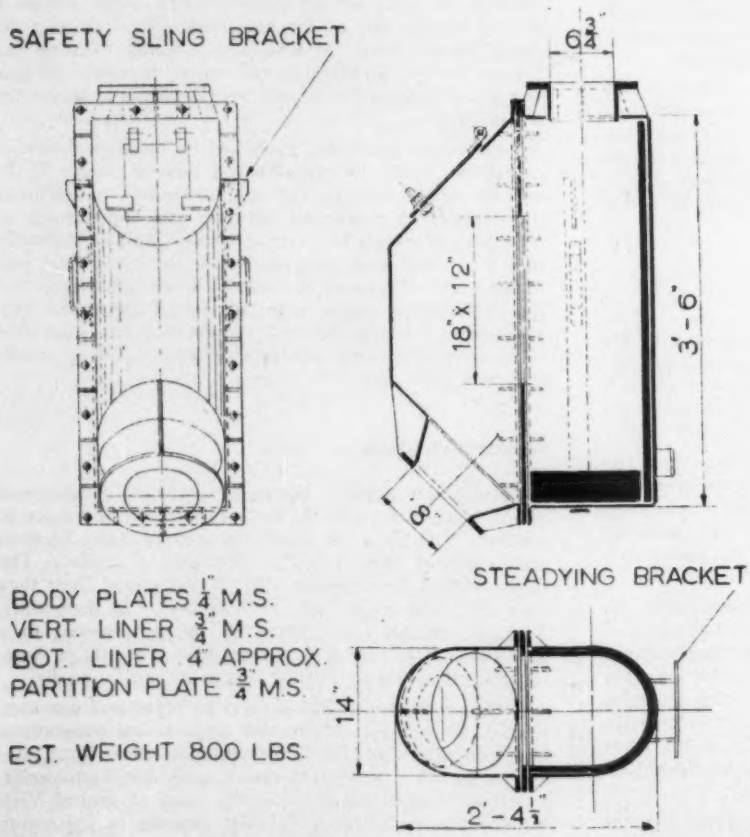
Service, safety, and production go hand in hand at the New Jersey Zinc Co.'s Eagle Mine at Gilman, Col., 112 miles west of Denver, United States. Much of the service at this Empire Zinc Division mine is done underground, where the cap lamp room and other facilities are located.

Typical of these service features, the cap lamp charging and repair station is located at the 16th level, 427 ft. below the No. 1 shaft collar. The installation houses 475 electric cap lamps and ten trip lamps, used by approximately 125 men on each shift.

This 15 ft. by 40 ft. cap lamp room is underground for convenience, economy, and speed in getting miners to their working places. Under this arrangement, the cap lamp room attendant can also service locomotive batteries and make minor electrical repairs throughout the mine.

ELECTRICAL PLANT FOR GOLD MINE WINDER

The General Electric Co. Ltd. has been entrusted by the Anglo American Corporation of South Africa with a contract for electrical plant and equipment valued at £59,000. The order covers the driving motors, control gear, and high-voltage switchgear for an a.c. winder to be installed at President Brand G.M., Orange Free State. The new winder is designed to raise a maximum of 230 tons of rock per hour from a depth of 5,600 ft. and is of the multi-drum Blair type with four ropes and two skips. It is driven by two 6,600 volt slipring motors with a combined output of 3,600 h.p. at 600 r.p.m., and the control scheme incorporates facilities for dynamic braking. The mechanical parts of the winder will be built in South Africa.



Concrete feed box used on Nos. 1 and 2 shafts, Free State Saaiplaas

MINING MISCELLANY

Cristiania Spigerverk, Oslo, Norway, has planned to mine 350,000 tons of raw ore this year, to produce 100,000 tons of magnetite concentrates at its iron mine, Rödsand, situated on the west coast of Norway. The mine shaft, which at present is 600 ft. deep, will eventually be sunk to 1,500 ft. to investigate the extension of the ore.

*

The Japanese Marubeni-Iida Co. has been appointed sole agent by the Atomic Energy Commission of Canada for sales of natural uranium and radio isotopes in Japan.

*

A Canadian scheme to build a transit harbour in Greenland for export of iron ore from Canada has been accepted in general terms by the Danish Government. Canadian harbours for this export trade are icebound a greater part of the year, whereas the projected transit harbour would be open most of the year.

*

The largest of the Norwegian aluminium producers, A/S Aardal og Sunndal Verk, has sold 28,000 tons in the first six months of this year against a total of 34,600 tons in 1957.

*

At the forthcoming International Autumn Trade Fair to be held at Utrecht, Holland, between September 2 and September 11, Great Britain will show 98 exhibits.

*

The chairman of the Danish Electricity Works stated at the annual general meeting that consumption of Danish lignite in 1957 was 2,100,000 tonnes, or twice that of the previous year. The director of the Danish Geological Investigation Authority recently announced that only 27,000,000 tonnes, or about nine years' supply, remained in known Danish deposits.

*

Nickel Rim Mines Ltd., of Canada, is suing two American steel companies for alleged breach of contract, covering the purchase of refined nickel.

*

A "Manveyor", a conveyor belt for people, whisks miners in and out of the Johnstown Coal and Coke Corporation mine in Panther Gulch, West Virginia, U.S.A., reports the *Wall Street Journal*. The belt runs down a 20-deg. slope to the mining area, some 97 ft. below the surface.

*

One of the miners coming off duty at Duke Pit, Ashington Colliery, at 9 a.m. on September 1, will be asked by Mr. G. Nelson, branch secretary of the National Union of Mineworkers, to press a button setting "Ernie" to work at Lytham St. Annes, picking winners in the sixteenth monthly premium savings draw. This town in Northumberland was chosen for the ceremony because it claims the thriftiest record in Great Britain.

*

An 18-ton continuous rotary vacuum filter built by Stockdale Engineering Ltd., Poynton, Cheshire, for use in a Belgian colliery, was transported under police escort to Salford Docks this month for shipment to Antwerp. The filter travelled on a Scammel articulated low-loader, and at Salford was lifted aboard the S.S. *Ardetta* by a floating crane.

*

A number of new mines in virgin coal areas in India have been opened by the National Coal Development Corporation during the last two years. They include Kathara in East Bokaro coalfields; Bachra, Gidi, and Saunda in Karanpura in Bihar, and Korba coalfield in Madhya Pradesh. More than 1,000,000 tons of coal has been exposed in Kathara, and dispatch has actually commenced. Underground mines being opened in the coalfields of Gidi, Saunda, and Bachra, will account for 3,500,000 tons annually.

*

The houses in the capital of Iceland, Reykjavik, are heated with water from the hot springs near the city. In order to get more water, four boreholes have been drilled in the city to depths of 1,300 to 2,200 ft., where boiling water was found.

*

A new copper discovery in British Columbia has caused a stir in mining circles. The main showing is in a series of ten trenches extending 1,030 ft. An average grade of 5.9 per cent copper over an average width of 8 ft. is indicated by surface sampling. The find is held under option by Fort Reliance Minerals Ltd., but, attracted by the high-grade nature of the discoveries, other mining interests have acquired ground in the area.

*

The Bolivian Mining Code is at present being studied by government experts and by legal and mining circles, with a view to making amendments to the original draft.

*

The Atomic Energy Research Institute has announced that five Japanese manufacturers will supply parts for the third Japanese research reactor, which is to be completed by the end of 1960.

*

The introduction of aluminium powder in the prevention of silicosis among the new producers of uranium in the Blind River district of Canada is referred to in the annual report of the McIntyre Research Foundation for 1957. The mine operators there, conscious of the highly siliceous nature of the ore being mined, have from the beginning embarked on a comprehensive programme of dust and medical control. A report on aluminium therapy in Mexico last year states that aluminium powder inhalation was used at the Santa Barbara and Parral units of the Compania Minera Asarco, S.A., and at the Buenos Aires and Plateros units of the Fresnillo Co.

*

The Thai Government has announced that a Bill will be introduced in the National Assembly this session amending the Tin Royalty Law. The Bill is intended to tighten loopholes for the evasion of payments of royalties and permit deduction of royalty payments before income tax. It will provide prison sentences for evasion of royalties. At present there are only cash fines.

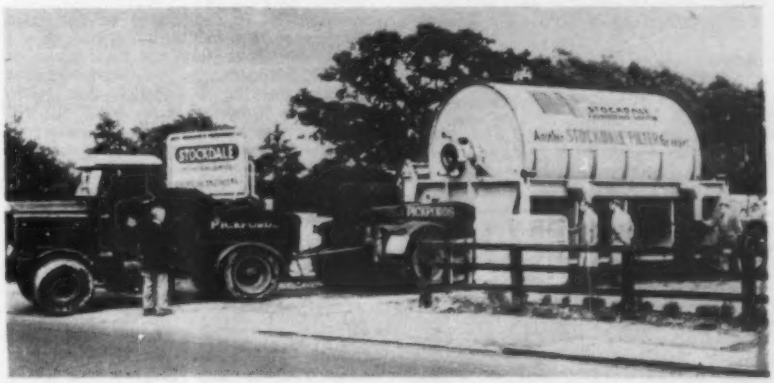
*

A seven-man engineering team from Kaiser Engineers, a division of the Henry J. Kaiser Co., is to leave the U.S. for Ghana within a week to study the economic and engineering feasibility of the Volta River hydroelectric project.

COMPANY EVENTS

Consolidating their venture into the South African market, made early in 1956, Birlec Ltd. announce that a Johannesburg branch office, under the management of Mr. S. G. King, has been formed. Situated between Boksburg and Benoni, it will deal with all inquiries, including project design and engineering service work. The postal address is P.O. Box 99, Witfield, Transvaal. Providing further evidence of Birlec's intention to expand in markets overseas, this development comes only three months after the announcement that a Canadian branch office had been established in Toronto. In the Federation of Rhodesia and Nyasaland, the British Thomson-Houston Co. (Central Africa) (Pvt.) Ltd. will continue to act as Birlec agents, but the services of the new branch will be fully available to Birlec furnace users in the Federation, particularly for technical advice and assistance.

Built by Stockdale Engineering Ltd., Poynton, Cheshire, this massive 8-ton continuous rotary vacuum filter is for shipment to a Belgian colliery



As from August 25, 1958, the address of the executive offices of Kelvin and Hughes Ltd. will be Empire Way, Wembley, Middlesex. The new telephone number is Wembley 8888 and the cable address Kelhue, Wembley.

★

The Scientific Film Association has moved to new offices in 3 Belgrave Square, S.W.1. The telephone number is Belgravia 6188.

★

Mr. H. R. King has been appointed deputy director-general (Standardization) of the Reconstruction Department at the National Headquarters of the National Coal Board in succession to Mr. W. Rowell. The appointment of Mr. Rowell as general manager of the No. 1 (West Fife) Area, Scottish Division, is announced.

CONFERENCES AND EXHIBITIONS

The annual convention of the Magnesium Association will be held at the Fort Shelby Hotel, Detroit, on October 16 and 17. It is expected that in addition to the usual technical papers and presentations, a number of applications of magnesium for missiles and rockets and other defence uses will be discussed.

★

A two-day course, to be organized by the Britain in Europe Committee and the Federal Educational and Research Trust, will take place shortly before the Commonwealth Economic Ministers' Conference in Montreal. It will be held at the St. Ermin's Hotel, London, S.W.1, on September 8-9, 1958. The theme will be "The Commonwealth and the New European Market".

★

The Materials Handling Group of the Institution of Production Engineers will hold a three-day convention in Brighton from October 13 to October 15, 1958. The convention is based on the theme "Finding the Practical Solution", and will take the form of team investigations of actual handling problems.

★

The opening meeting of the North-Western Fuel Luncheon Club is October 8, 1958, on which date the annual general meeting will be held immediately after lunch. Other meetings during this session will take place on November 5, December 3, January 7, 1959, February 4, March 4, April 1, and May 6.

★

This is the golden jubilee year of the Institute of Metals, which is holding its autumn meeting in Birmingham from September 22-26. The programme includes visits to many works and places of interest.

CONTRACTS AND TENDERS

India

Sealed tenders are invited for supply of coal tub wheels with axles to Giridih Colliery. Tenders will be received by Mr. K. Mitra, Assistant Purchase Officer, 1 Council House Street, Calcutta 1, up to 11 a.m. on 16/9/58. Ref. E.S.B. 20793/58. Telephone inquiries to Chancery 4411, extension 738 or 771.

India

A tender calling for four mobile blast-hole drills, three portable air compressors, and a diesel engine, has been issued. Bids should be sent to the Deputy General Manager (Technical) of the issuing authority, Neyveli Lignite Corp. (Private) Ltd., Neyveli (South Arcot District, Madras State). Closing date is September 5, 1958. Ref. E.S.B. 20609/58. Telephone inquiries to Chancery 4411, extension 738 or 771.

India

The National Coal Development Corp. (Private) Ltd. (a Government of India undertaking) invites tenders for the supply of lifting chain, adjuster slings, single sheave pulley, double sheave pulley, hydraulic lifting jack and crab winch to Gidi Colliery (Tender No. DEV/Gidi-Gen/58). Tenders to the Asst. Purchase Officer, 1 Council House Street, Calcutta 1. Closing date, September 26, 1958. B.O.T. Ref. E.S.B. 20792/58. Telephone inquiries to Chancery 4411, extension 738 or 771.

The Atomic Energy Conference

It is three years since the First International Conference on the Peaceful Uses of Atomic Energy was held in Geneva, and for the first time the atomic energy projects of the Eastern and Western World were freely discussed. Since that time there have been notable advances in the harnessing of nuclear energy for power production in the United Kingdom and elsewhere, and atomic energy commissions have been established in many nations. The uranium industry has been firmly established as one of the most important sectors in the mining world, and in maturity has been faced with all the normal market and economic problems of the older established metal producers. Fusion power, which was merely hinted at in 1955, can now form the subject of lengthy and detailed research papers.

There will obviously be a vast field of progress to be reviewed at the Second International Conference to be held in Geneva on September 1 to 13 this year. The number of papers submitted is, in fact, more than double that in 1955, and, the average length of paper having also increased by over 40 per cent, time will be available for only about a quarter of them to be read.

The 1955 Conference was, at the time, the largest scientific congress ever held, being attended by 1,400 people, representing 73 countries; 1,067 papers were presented by 38 governments and five agencies. So far this year 2,400 abstracts of papers have been received by the U.N. from 45 governments and four organizations. The 1958 British contingent, besides the five official delegates, will comprise 250 advisers and an equal number of observers.

As in 1955, two exhibitions will be held at the same time as the conference; a scientific exhibition at the Palais des Nations, and an industrial exhibition in the city of Geneva.

The scientific exhibition this year will be housed in a special building, and not in various parts of the Palais des Nations building as in 1955. One of the main themes of this exhibition, which covers more than four times the floor space of the 1955 display, will be thermo-nuclear power, and the U.K.A.E.A. has taken 5,000 sq. ft. of space in which it will display large-scale models of Zeta and Sceptre III and feature surveying for raw materials and other aspects of the British nuclear power programme. A reflection microscope photometer for the speedy identification of minerals and a new type of chromatograph with a sensitivity 100,000 times that of conventional models will also be shown.

Other countries exhibiting at the Palais des Nations include the U.S.S.R. with 10,000 sq. ft. of space, France with 6,000 sq. ft., and South Africa, Australia, Canada, Japan, and Hungary, with lesser amounts. Altogether 21 nations have requested over 70,000 sq. ft. of space, nearly half of which will be occupied by the U.S.A., which is devoting an area to fusion exhibits twice that of the entire U.K. stand. A 10 kW. General Dynamics reactor will be supplying short-lived isotopes for use in the U.S.A.E.C. demonstrations.

At the commercial exhibition to be held in the Palais des Expositions in Geneva, Britain will be the largest participator with 47,000 sq. ft. of stands and exhibits. Altogether there will be exhibitors from 13 countries, nearly 100 of whom are British companies, including 25 nucleonic instrument manufacturers. The U.K.A.E.A. is also occupying 3,500 sq. ft. of space at the Palais des Expositions.

At the Conference the first four days are to be largely devoted to general sessions, after which the Conference will split into five parallel sections. Although all will be awaiting with interest the views expressed in the section dealing with power reactors and fusion research (which alone will occupy 18 hours of papers and discussion), material of interest to the mining industry is most likely to be found in Section E, the programme for the first half of which is as follows:

Session E 5: *Raw Material Resources.* Reports on resources, production, and reserves of nuclear raw materials and their economic aspects.

Session E 6 and 7a: *Treatment of Ores.* Concentration processes, including mechanical, ion exchange, solvent extraction, precipitation, and methods of analysis.

Session E 7b: *Geochemistry.* Geochemical prospecting techniques, age determination by radio-isotope methods.

Session E 9: *Mineralogy, Geology and Prospecting.* Metallogenesis, geological descriptions of workable deposits, prospecting methods.

Session E 10: *Mining.* Interpretation of exploration data, evaluation of reserves, mining techniques, radiometric pre-concentration.

Session E 11 and E 12: *Production of Nuclear Raw Materials.* Production and refining of uranium and thorium of nuclear purity. Metallurgical aspects of the production of nuclear raw materials such as graphite, zirconium, beryllium, etc.

All told there will be 80 sessions, nearly half as many again as in 1955, and some 220,000,000 pages of extracts and papers weighing over 500 tons will have to be printed before the Conference opens. From the wealth of information contained in the Conference papers it is hoped to cover some of the items of particular interest to the mining industry in these columns.

Metals and Minerals

The Rhodesian Chrome Trade

In striking contrast with the production returns, as reported to the Colony's Mining Commissioners and published by the Chamber of Mines, are the latest export figures for Southern Rhodesian chrome ore exports issued at Salisbury by the Central Statistical Office.

Production for the first five months of 1958 is shown as 273,460 tons, valued at £1,866,736, compared with 240,722 s.tons, worth £1,613,284, in the corresponding period of last year. On the other hand, the export figures—which give the most accurate statistical picture available of how the country's chrome industry is faring—show a sharp drop in both tonnage and value over these periods. In January-May last year, 270,000 s.tons, valued at £2,228,000, were exported; this year, in the first five months, exports amounted to only 200,000 tons, worth £1,579,000.

Admittedly, exports last year were given a fillip by the ending of the rail transport bottleneck in Southern Rhodesia and the availability of large quantities from stockpiles. Even so, this year's tonnage remains disappointing when compared with that of 1956. In the whole of 1956, monthly exports averaged some 42,600 s.tons, compared with 40,000 per month in the first five months of the current year. Export values averaged £315,800 per month in the first five months of this year, compared with £445,600 in the corresponding period of 1957 and £310,833 monthly over the whole of 1956.

The latest figures for railings of chrome to ports show that, after falling in June to 48,094 s.tons—the lowest total of the year to date—tonnage rose again in July to 53,573 tons. July railings were the third highest so far for 1958, but were still well below the peak of 60,059 s.tons recorded in January.

According to the latest reports from industry sources, the market is still "dead", with no new business passing. Most of the ore being produced is being railed to ports for shipments under contracts signed a considerable time ago, while certain tonnages are still going into stockpiles—at both mines and port dumps.

The recent reductions in prices for Rhodesian material by 10s. per ton (following a similar reduction in Conference Line freight rates from East Africa) do not as yet appear to have stimulated any significant demand. The most encouraging aspect of the current situation is, of course, the slow but steady pick-up in U.S. steel production, which, if it continues, may be expected to have a favourable impact on the chrome ore market.

*

It is noteworthy that West German imports of chrome ore were considerably higher in the first five months of this year than in the same period in 1957, amounting to about 125,279 tons against 80,153 tons. The increase was attributed primarily to the unchanged demand by the special steel industry, which still enjoyed a highly favourable development of production and sales.

Consolidated Mines, the Philippine producer of refractory chromite, will start shipping this month 146,204 l.tons of ore to the U.S. in exchange for 30,000 tonnes of California pearl milled rice.

*

Liberty Chromite Mining Corp., a Philippine producer of metallurgical chrome ore, has announced the conclusion of a contract with E. A. Godoy and Co. Inc., of New York, appointing the latter its exclusive sales agent and representative on a world-wide basis in the distribution of its chromite and manganese ore production. The contract does not include distribution of the company's ore for the Japanese market.

PROPOSED MANGANESE CESS

The Indian Government propose shortly to introduce a Bill in Parliament to levy a cess on exports of manganese ore to finance a welfare scheme for manganese miners. The Bill would authorize the government to impose a maximum cess of 6 Rs. a ton, but the government only proposes to levy 2 Rs. at the moment. The government does not think the levy of such a small cess would affect exports. Similar legislation covering workers in the iron mines is also under consideration.

The Indian Government has also announced its intention to send a delegation overseas to negotiate for fresh business for the manganese industry and to explore further possibilities of exporting the ore.

According to the Minister for Steel, Mines and Fuel, 82 Indian manganese mines closed down during the first six months of 1958. This makes a total of 136 mines which have closed since the beginning of 1957. The closures are attributed to various causes, including persistent yield of low-grade ore for which there is only a restricted market. Furthermore, a fall in the price of manganese ore has made it uneconomic for mines to produce low-grade ores.

COBALT AND ITS ALLOYS

The Cobalt Information Centre has announced the publication of its new reference bibliography, *Cobalt and Its Alloys: a Summary of Allotropy and Phase Diagrams*. The 125-page bibliography contains several hundred references to cobalt literature, as well as two-colour phase diagrams of numerous alloy systems. It is obtainable by writing directly to: Le Centre d'Information du Cobalt, 35 rue des Colonies, Brussels, Belgium.

ALUMINIUM CONTRACT SIGNED

A 2,000,000,000 kr. (£100,000,000) aluminium contract has been signed between the Aardal and Sunndal Verk of Norway and Aluminium Union Ltd., of Canada. It provides for the delivery of some 4,000,000 tons of alumina over a period of twenty years by the Canadian company, a subsidiary of Aluminium Ltd., from its plant in Jamaica, against aluminium supplies from the Norwegian firm.

OVERSUPPLY OF TITANIUM ORES

The Bureau of Mines, U.S. Department of the Interior, reports that the fall in United States requirements of rutile for the manufacture of titanium metal resulted in an oversupply of this commodity in 1957. World rutile production is estimated to have increased 30 per cent over 1956 to a new peak of 158,400 s.tons. World ilmenite production continued to increase and reached a new peak of 1,900,000 s.tons.

Australia was the leading producer of rutile, supplying 93 per cent of the total. The United States was again the leading producer of ilmenite, supplying 39 per cent of the total. Curtailment of tin operations in Malaya was expected to decrease the ilmenite concentrate available for shipment. Production of ilmenite in Australia, as gauged by sales, jumped from 4,800 s.tons in 1956 to an estimated 50,000 s.tons in 1957.

RECORD GRAPHITE OUTPUT

World production of natural graphite reached an all-time peak in 1957, due to a sharp rise in the recorded output of amorphous graphite in the Republic of Korea, reports the Bureau of Mines, U.S. Department of the Interior. During 1957, the export of anthracite coal from the Republic of Korea was banned, whereas export of amorphous graphite was permitted. It seems likely that, as reported in the Korean Press, sizeable quantities of anthracite were exported as "amorphous graphite". Production in most other countries remained about the same or decreased moderately.

The total world output for 1957 is estimated at 320,000 s.tons, as compared with 270,000 tons in the previous year. Korea with 162,703 s.tons accounted for slightly over half the world total. The second largest producer was the U.S.S.R., with an estimated 50,000 tons, followed by Mexico (25,938), Austria (20,860), Madagascar (17,600), and Ceylon (exports, 9,170). The Bureau of Mines is not at liberty to publish United States production figures.

United States consumption of natural graphite in 1957 amounted to 41,000 s.tons valued at $5,568,000, increasing 2 per cent in quantity compared with 1956, but decreasing 6 per cent in value. The two largest increases were reported for bearings (22 per cent) and foundry facings (17 per cent). Decreases ranging from 14 to 16 per cent were reported for other uses, except steelmaking and brake linings, which used about the same quantities as in 1956.

Graphite imported for consumption in the United States declined in 1957 to 41,500 tons from 47,900 tons in the previous year, imports being valued at $2,106,800 against $2,593,700.

COPPER · TIN · LEAD · ZINC

On Friday morning it was known that the Seaton Plan had been voted down in the House of Representatives and the initial reaction was a sharp fall in the price of copper with relatively smaller rises in the prices for lead and zinc, but the movement in the copper price was quickly reversed while that for the other two metals continued for several days. On looking back it appears that the action by Kennecott in announcing that they were re-introducing a six-day week must have been one of the main causes for the adverse vote in the House of Representatives, as it became very difficult for the supporters of the scheme to be able to justify the government buying of 150,000 tons of copper at the same moment as the country's chief producer was announcing an increase in production on the grounds of good demand.

With the defeat of the Bill it is now necessary for President Eisenhower to take some action on the tariff commission's recommendation for increased duties on lead and zinc and whereas some people hope that he will announce shortly an increase in the duties, others feel that on purely political grounds the President may request that a completely new set of hearings be commenced. The first reaction amongst American lead producers was that the St. Joseph Lead Co. announced a reduction of 20 per cent in production on the ground that they had not been selling their output for many months past and were not prepared to build up further stocks. The protagonists of copper stockpiling have also not accepted defeat and an attempt is being made to show that the Administration already has legal powers to order the stockpiling of 100,000 tons of the metal but it seems unlikely that much notice will be taken of this.

LOWER COPPER STOCKS

In the copper market, apart from the sharp fall on Friday, the main interest has been in the reduction of the published stocks which on Monday were 400 tons lower at 11,942 l.tons and that in spite of this a slight contango appears to be developing. In America, the customs smelter price for the purchase of scrap was reduced at the end of last week to 20½ c. per lb., the reason given being that scrap merchants were offering more metal than had been their custom during recent weeks and at the same time demand for copper was described as being light.

There have been numerous rumours that Russia has been buying sizeable tonnages of the metal, but most people feel that it has only been a matter of enquiry up to date, and very little business has actually been transacted.

The announcement by Kennecott that, on account of the improvement in demand, they are intending to operate on a basis of a six-day week instead of the existing five-day week as from early September, has given rise to speculation as to whether other copper producers will now consider themselves entitled to increase production proportionately, but the majority opinion is that this is unlikely to happen.

SALES OF RUSSIAN TIN

The tin market has again been featureless with the price level being based on the buffer stock support price although the tonnage of metal, which the buffer stock manager has had to buy during the last week, has been very considerably less than during the previous five days. Demand is still patchy but stocks in official warehouses once again were lower by 257 tons at a total of 16,788 l.tons.

During the week there have been a number of reports from Malaya that the authorities there are becoming more and more dissatisfied with the tonnage of Russian tin which is being sold on the world markets. It was rumoured that an approach had been made to the Soviet Union asking them to suspend immediately all exports of Russian tin, whilst at the same time the United Kingdom Government had been asked to impose immediate restrictions on imports of Russian tin.

On Thursday morning the Eastern price was equivalent to £749 per ton c.i.f. London.

UNCERTAIN OUTLOOK FOR LEAD-ZINC

Although both the lead and zinc markets received a boost from the failure of the Seaton Plan most people feel that the present strength will not be maintained as it is certain that the clamour for action in respect of increased duties will increase. Demand for both metals throughout the world can be described as barely satisfactory and, therefore, it can be assumed that there is an excess production of lead, whereas for zinc it seems probable that with the cuts, which have been made recently, there is now a slight excess of demand over supply.

The latest statistics published in the United States show that stocks of lead in producers' hands at the end of July amounted to 164,800 s.tons which was about 1,500 tons higher than at the end of June in spite of a drop in production of almost 6,000 tons at 38,827 s.tons. Shipments to domestic consumers at 31,948 s.tons were the smallest since August, 1955, but due to the cessation of government stockpiling the tonnage going to industry probably showed an improvement over June. Zinc output in June at 33,600 s.tons, showed a further 6 per cent fall as compared with the previous month.

Closing prices are as follows:

	Aug. 21 *Buyers*	Aug. 21 *Sellers*	Aug. 28 *Buyers*	Aug. 28 *Sellers*
COPPER				
Cash	£207½	£207¾	£201	£201¼
Three months	£207½	£207¾	£201½	£201¾
Settlement	£207¾		£201¼	
Week's turnover	7,150 tons		8,400 tons	
LEAD				
Current ½ month	£67⅞	£68	£69¼	£69½
Three months	£69⅛	£69½	£71¼	£71½
Week's turnover	5,675 tons		6,925 tons	
TIN				
Cash	£730	£730½	£730½	£731
Three months	£730	£730½	£730½	£731
Settlement	£730½		£731	
Week's turnover	1,435 tons		575 tons	
ZINC				
Current ½ month	£62	£62¼	£63¼	£63½
Three months	£62¼	£62½	£64¼	£64½
Week's turnover	3,825 tons		6,900 tons	

LONDON METAL AND ORE PRICES, AUG. 28, 1958

METAL PRICES

Aluminium, 99.5%, £180 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £190 per ton
Crude (70%) £190 per ton
Ore (60%) bases 19s. 6d./20s. 6d. nom. per unit, c.i.f.

Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 10s. 0d. lb.
Cerium (99% net), £16 0s. lb. delivered U.K.
Chromium, Cr. 99% 6s. 11d. lb.
Cobalt, 16s. lb.
Germanium, 99.99%, Ge. kilo lots 2s. 8d. per gram
Gold, 250s. 6½d.
Iridium, £20/£22 oz. nom.
Lanthanum (98/99%) 15s. per gram.
Manganese Metal (96% - 98%) £290
Magnesium, 2s. 5½d. lb.
Nickel, 99.5% (home trade) £600 per ton
Osmium, £17/£18 oz. nom.
Osmiridium, nom
Palladium, £5/£5 15s.
Platinum U.K. and Empire Refined £23 5s. oz.
Imported £19 0s./£21 0s.
Quicksilver, £79 0s. ex-warehouse
Rhodium, £40/£42 oz.
Ruthenium, £14/£16 oz. nom.
Selenium, 50s. 0d. per lb.
Silver, 75d. f. oz. spot and 74¼d. f'd.
Tellurium, 15s./16s. lb.

ORES AND OXIDES

Bismuth		65% 8s. 6d. lb. c.i.f. 18/20% 1s. 3d. lb. c.i.f.
Chrome Ore—		
Rhodesian Metallurgical (semifriable) 48%	(Ratio 3:1)	£15 15s. 0d. per ton c.i.f.
" Hard Lumpy 45%	(Ratio 3:1)	£15 10s. 0d. per ton c.i.f.
" Refractory 40%		£11 0s. 0d. per ton c.i.f.
" Smalls 44%	(Ratio 3:1)	£14 0s. 0d. per ton c.i.f.
Baluchistan 48%	(Ratio 3:1)	£11 15s. 0d. per ton f.o.b.
Columbite, 65% combined oxides, high grade		nom.
Fluorspar—		
Acid Grade, Flotated Material		£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2)		156s. 0d. ex works
Lithium Ore—		
Petalite min. 3½% Li_2O		40s. 0d./45s. 0d. per unit f.o.b. Beira
Lepidolite min. 3½% Li_2O		40s. 0d./45s. 0d. per unit f.o.b. Beira
Amblygonite basis 7% Li_2O		£25 0s. per ton f.o.b. Beira
Magnesite, ground calcined		£28 0s./£30 0s. d/d
Magnesite Raw (ground)		£21 0s./£22 0s. d/d
Manganese Ore Indian—		
Europe (46% - 48%) basis 67s. 6d. freight		nom.
Manganese Ore (43% - 45%)		nom.
Manganese Ore (38% - 40%)		nom.
Molybdenite (85% basis)		8s. 5d. per lb. (f.o.b.
Titanium Ore—		
Rutile 95/97% TiO_2 (prompt delivery)		£35/£36 per ton c.i.f. Aust'n.
Ilmenite 52/54% TiO_2		£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)		60s. 0d./65s. 0d. per unit c.i.f.
Vanadium—		
Fused oxide 95% V_2O_5		8s. 11d. per lb. V_2O_5 c.i.f.
Zircon Sand Australian (65 - 66% ZrO_2)		£14 0s. per ton c.i.f.

Mining Finance

The West Wits Take-over

At the end of July, West Witwatersrand Areas revealed that options had been acquired to purchase the entire issued capital of New Consolidated Free State Exploration. A further statement has been issued this week calling for an extraordinary meeting to consider resolutions for the exercise of the company's options.

The terms of the take-over—two West Wits and 10s. for five N.C.F.S.E.—appear favourable to West Wits shareholders. For the purpose of the exchange, New Consolidated Free State shares were valued at 20s. (the company is not quoted on any stock exchange), while 45s. was taken as an estimate of the average price of West Wits shares on the Johannesburg Stock Exchange during July. Both these values are fair and reasonable as a basis to be adopted for a transaction of this kind.

However, the real importance of this deal is in the strengthening and revitalizing of the West Wits portfolio. Of the five mines in which West Wits is materially interested, three (Blyvooruitzicht, Libanon, and Venterspost) are already producing at or near their peak rate, and only Doornfontein and West Driefontein offer any substantial growth prospects. Over and above this, the fact that only five mines feature in the portfolio, and these all in a small area geographically, has made the shares less attractive to the investor interested in finance company shares. Ample evidence of this is given in the respective yields of West Wits and West Rand Investment Trust, a similar company, but one which has a portfolio containing eleven producers against West Wits' five. At the present time West Wits are priced at about 46s. 6d. to yield 6.9 per cent, while Writs stand at around 50s. 3d., yielding 6.3 per cent on the last two distributions.

Although the take-over will not completely redress this position, certainly the addition of Harmony and F.S. Saaiplaas to the portfolio will go some way towards stimulating its growth now that the original impetus is beginning to fall off. At the same time, a wider spread will be accomplished, both in the number of mines in the portfolio and in their location.

Assuming that the take-over meets with the approval of West Wits' shareholders, the company's asset value will be about £20,225 (or 47s. 7d. per share on the new capital), made up as follows:

Shares (000)	*Company*	*Value* (£000)
3,002	Blyvoor	3,452
1,826	Doornfontein	2,511
2,221	Libanon	888
1,024	Venterspost	755
1,444	W. Driefontein	7,536
1,248	Harmony	2,387
1,931	Saaiplaas shares ...	1,521
11	Saaiplaas notes ...	7
Unquoted investments at cost		155
Loan (approx.)		72
Net current assets (approx.)...		245
Other assets (approx.)		700
		20,229

Additionally, West Wits has an interest in the Western Deep Level flotation, which may be valued at about 2s. 9d. per share at the present time.

Thus the market price is fully backed by assets, and with the improved growth prospects West Wits' shares should be well worth holding.

LONDON MARKET HIGHLIGHTS

The gold share market continued to forge ahead during the past week. Business, while not exceptional, also expanded with the movement, and *The Financial Times* gold share index climbed steadily to new peaks for the year. Once again the impact of the recent Dillon Read Trust on Johannesburg operators provided the mainspring of the movement. Likely candidates for the U.S. Trust's portfolio were steadily acquired by Cape buyers: shares such as Buffelsfontein, Vaal Reefs, and Winkelhaak gained further ground.

The recent emergence of Brussels buying as a market factor was again felt in Western Reefs. President Brand, too, were supported from this centre. More general interest lifted St. Helena to an eight-year peak of 44s. and Free State Geduld (95s.) were helped, apart from anything else, by hopes of a good dividend next month. Other hopes expressed in Throgmorton and Hollard Streets concerned the progress of development in the south-western part of Welkom (16s.), the likelihood of a good reef strike in the Free State Saaiplaas No. 2 shaft, and the expected Zandpan flotation, with its benefits to Middle Wit shareholders.

The death of the South African Premier, Mr. Strijdom, produced some hesitancy in the Kaffir market for a while. It was considered, however, that there was not likely to be any drastic change of government policy following the appointment of a successor, and the market soon regained its earlier aplomb.

One other cross-current in the buoyancy of Kaffirs generally was the recently publicized possibility that sales of South African uranium might be arranged over and above those already covered by existing contracts. Continental buyers were attracted to Randfontein (25s. 4½d.) by the implications of this idea. Dominion Reefs (15s. 9d.) also went ahead and there was a quiet speculative demand for the neighbouring mine, Klerksdorp, generally conceded to be a potential producer of uranium.

Copper shares bore the disappointment of the failure of the U.S. Minerals Subsidy Bill with more equanimity than did the metal price. Business was very subdued, but share prices seldom lost ground. R.S.T. from time to time reflected a certain amount of United States demand.

Rejection of the U.S. Bill lifted the London price of lead and zinc and was responsible for renewed firmness in the shares of Australian producers of the metals. No striking advances were seen, but Consolidated Zinc (52s.) and New Broken Hill (33s. 6d.) both showed to advantage at one time.

Tin shares remained quietly steady despite the current apprehension felt over the outlook for the Tin Agreement and consequently for the metal price. Tronoh (10s. 4½d.) and Southern Tronoh (8s. 6d.) moved up on the highly satisfactory increase in both profits and dividends. It was realized that these figures covered the financial year which ended just before the Tin Agreement restrictions began to bit producers. Even so, the substantial tax savings resulting from O.T.C. concessions will be a big help to both companies during the present difficult times for Malayan tin mines.

RIO TINTO AT GENEVA

The dynamism of the Rio Tinto group is a household word in the industry. For many years the only active interest of the group was the famous pyrite mines of Spain. Now, on the other hand, the group covers four continents, numbering among its activities and interests the Northern Rhodesian copper industry and oil companies in Canada, Trinidad and the U.S.A.

More than anything else, however, the Rio Tinto group is linked in the public imagination with two of the world's most important uranium mining operations: the Mary Kathleen Mine in Queensland, and the exploitation of the immense Blind River field in Canada, which involved the development of eight mines and the construction of seven mills at an unprecedented rate.

As was mentioned here last week, the present problem of the uranium producer is finding markets for his wares. Rio has always tackled this problem aggressively, a good example being the formation recently of Rio Tinto Dow, a company jointly operated by Rio Tinto and Dow Chemical with the object of research into and the production of new nuclear fuel forms and high-purity uranium/thorium compounds. Rio's latest move in this direction is the taking of a stand at the coming "Atoms for Peace" exhibition in Geneva. The only uranium producer exhibiting in the British section of the exhibition, Rio have centred their display around a specimen of uranium concentrate containing over 80 per cent U_3O_8. This is the kind of salesmanship that the industry needs.

TRONOH AND S. TRONOH PAY MORE

The speed with which a trend can double back on its tracks is well illustrated by the preliminary results issued this week by Tronoh Mines and Southern Tronoh Tin Dredging for 1957. In most

respects these results are exceptionally good; and yet the tin share market is at the present time very greatly depressed by the combined effects on company profits of a metal price unable to rise above floor level, of output restriction, of buffer stock contributions and of "red" tin.

Both company's profits are inflated by O.T.C. savings; 1957 was a transitional year, and the result is that the taxation appropriations are less than will be needed even in a normal year as an O.T.C. Nevertheless, on a basis of gross profits, allowing for special credits and debits, earnings were substantially up, Tronoh's from £836,967 to £888,627, and S. Tronoh's from £172,547 to £209,277. Wisely, both companies are making substantially increased transfers to reserves, but even after these transfers sufficient remains to increase the distributions for the year. Tronoh is recommending a final dividend and bonus totalling 1s. per share, making 3s. per share against 2s. 4½d., while Tronoh's proposed final is 6d., making 2s. 6½d. against 1s. 4½d.

Nevertheless, in considering these excellent results it should be remembered that the shape of things to come is probably forecast more accurately by the fact that Tronoh's first interim was cut from 6d. to 4d., while S. Tronoh has not paid at all.

The meetings will be held on October 10. Mr. J. H. Rich is chairman of both companies.

MORE NEWS OF A-SAIT

Dillon Read's new investment trust filed its registration statement with the S.E.C. on Wednesday. It covers 1,000,000 shares of £1 nominal value, which will be offered next month at a maximum of $28 per share to investors both in the U.S.A. and Europe.

The Trust's policy, as defined in the statement of registration, will be to invest rather more than 50 per cent of the Trust's resources in Kaffirs and the remainder in industrials with the proviso that up to 25 per cent of total assets may be held in gold bullion or its equivalent. Only a minor portion of net income will be distributed; the greater part, together with capital gains, will be re-invested.

NO AUTUMN SURPRISES?

Only a fortnight now remains before the opening of the autumn dividend season for the O.F.S. producers. After the surprises last autumn and spring, it might be well at this stage to consider the prospects for the coming distributions.

One of the biggest question marks is that overhanging Free State Geduld's coming payment. It will be remembered that this company entered the dividend list with 1s. per share last autumn, and the surprise occasioned by this increased in proportion when 2s. was paid in the spring. The key to Geduld's next payment lies in the company's capital expenditure programme, which in turn is linked to the progress of the company's new No. 2 ventilation shaft. Using the company's estimate of £850,000 for the total of capital expenditure in 1957/8, and assuming that the profit for the last three months of the year will be about the same as that for the June three months, however, it would seem that about 2s. 3d. will be available for distribution. This might well be 3d. higher when the payment is made, but anything more than 2s. 6d. per share looks to be out of the question.

St. Helena is another property where dividend policy is effectively determined by the capital expenditure programme. The cost of this for 1958 was originally estimated at £800,000, which would have allowed the declaration of dividends totalling 2s. 6d. - 2s. 9d. for the year. However, at the annual meeting the chairman increased this estimate by £500,000, which makes 1s. 3d. look like the maximum possible.

Two of the O.F.S. enigmas are Welkom (because the first payment was made before profits were even covering capital expenditure) and President Steyn (because last March's payment was reduced by 3d. from the previous autumn's payment — the first dividend cut by any O.F.S. producer). With about £1,000,000 of loan facilities to be repaid by the end of 1959, capital expenditure for 1957-8 estimated at some £1,150,000, and almost £1,180,000 of debentures to be redeemed equally with dividends, even 3d. would look too high for September were it not for the fact that an interim 3d. has already been paid. At all events, no expansion in the present rate should be looked for. At Steyn, similarly, it would seem prudent to treat the dividend rate as stabilized at 2s. 9d. for the time being.

Financial News and Results

New Loan for St. John d'El Rey.—St. John d'El Rey has issued a further £200,000 convertible debenture at par.

Malayan Tin Offer for Kramat Pulai.—Malayan Tin Dredging and Kramat Pulai have agreed terms under which Malayan Tin will offer one share and 4s. 6d. cash for every three Kramat Pulai shares. Malayan Tin already holds 85,333 of the 400,000 Kramat Pulai shares in issue. Further details will be released in mid-September.

Western Mining's Lower Earnings.—Consolidated net profits attributable to Western Mining Corporation declined from £375,180 in the year to March 31, 1956, to £352,863 in 1957. Share write-offs were lower, however, and dividends totalling 1s. per share were paid—the same as in 1956 but on a larger capital. Meeting, Melbourne, September 17. Mr. G. Lindesay Clarke is chairman.

Subsidy For Emperor.—The Fiji Government has agreed to grant a subsidy on the gold production of Emperor Gold Mining Co., the operating subsidiary company of Emperor Mines. The subsidy will run for three years from June 19 last, and will be paid at the rate of £F2 per oz. to a maximum of £F150,000 per annum. A condition of the subsidy is that Emperor will be subject to Fiji income tax and royalty levies. The directors say that the subsidy will make a material contribution to the development of the mine's lower levels.

Tweefontein to Reduce Capital.—Tweefontein United Collieries is to repay the whole of its Cumulative Preference and Participating share capital at December 31 next, subject to shareholders' approval at a meeting to be held on September 12 in Johannesburg. The shares will be repaid at par, but a special dividend of 4s. per share is to be paid as compensation for the loss of participation rights. The repayment is due to the failure of the company's tender for the supply of coal to a new power station in the Eastern Transvaal, which has left cash resources at a higher level than is warranted.

Indian Copper's Tax Cushion.—In common with most producers of the red metal, Indian Copper's results for 1957, while quite satisfactory, showed some reduction from the high level of 1956. Profit before tax fell to £1,123,749 from £1,507,184, but a sharp fall in the appropriation for taxation left net distributable income only £22,045 lower. Reserve appropriations totalled £350,000 (the same as in 1956), and a final dividend of 18 per cent is recommended which compares with two dividends totalling 20 per cent in the previous year.

Publications Received

Core drilling in the exploration of the potential coalfield areas of the Bechuanaland Protectorate has been carried out by the drilling section of the Geological Survey Department since 1950. As a result of this work three potential coalfields have been defined in the eastern half of the territory. The results available from the first fifty boreholes have been published by the Department. *Coal Exploration Records of Boreholes*, vol. I, 1957. Price 3s.

★

A survey entitled *The Industrial Minerals of Newfoundland* has been published by the Department of Mines and Technical Surveys, Ottawa. The author is Mr. G. F. Carr, Industrial Minerals Division, Mines Branch. Production of industrial minerals has increased considerably in Newfoundland, and in 1956 it reached the record value of $7,650,821. Fluorspar accounted for 44.5 per cent by value of the total output. A high proportion of the island's industrial mineral production is shipped to the mainland.

★

Last year the Province's mines again reached new peaks of production, and they yielded an all-time record total of $739,219,218 in new wealth, records the Ontario Department of Mines in a report aptly entitled *Forging Ahead in 1957*. This preliminary estimate marks a gain of $88,395,956 over the final Dominion Bureau of Statistics total for 1956. The greatest single increase in production was accounted for by the uranium mining industry. The value of the output of this material increased by almost $69,000,000 to a total of $78,235,359. It is noteworthy that Ontario's production of uranium in 1957 exceeded in value by more than $3,000,000 the year's production of all the uranium mines in the U.S.

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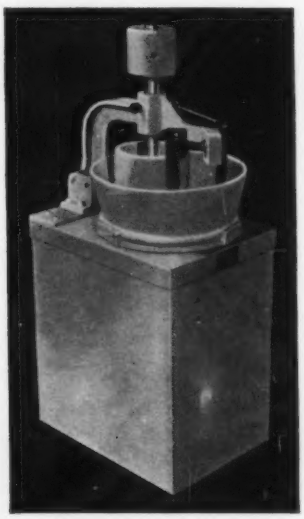

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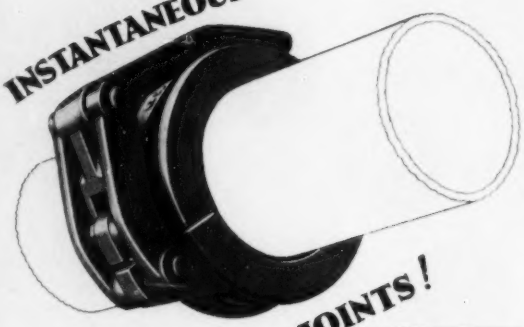

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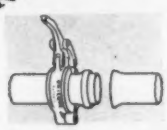
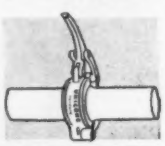
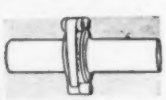


Rubber gasket in position and joint ready to pull over.



Pipe ends joined ready for locking.



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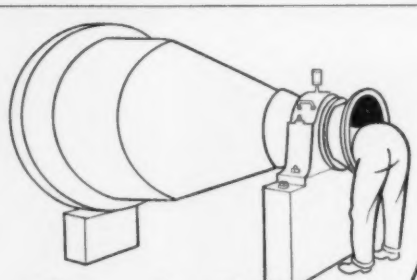

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